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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/980,468	12/03/2001	Ernst Heinz	0093/00029	3433

26474 7590 07/14/2004

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EXAMINER	
MCELWAIN, ELIZABETH F	

ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No.	Applicant(s)	
	09/980,468	HEINZ ET AL.	
	Examiner	Art Unit	
	Elizabeth F. McElwain	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,16-20,22 and 23* is/are pending in the application.

4a) Of the above claim(s) *2,3 and 13, 14, 16-20, 22 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/3/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, SEQ ID NO: 1 and 2, in the reply filed on April 23, 2004 is acknowledged. The traversal is on the ground(s) that Example 17 of the PCT Administrative Instructions says that there can be unity between the DNA and the protein, and that 10 nucleotide sequences may be examined in a single application. This is not found persuasive because in Example 17 the claims are drawn to protein "X" and DNA sequence encoding protein "X", while the present claims are drawn much more broadly to nucleic acid sequences that are derivatives that code for polypeptides that have as little as 75% homology at the amino acid level. Therefore, there is no one to one correspondence between the protein and the DNA. Furthermore, applicants are claiming an entire genus of sequences in the claims drawn to SEQ ID NO: 1 and DNA encoding SEQ ID NO: 2, which is far greater than 10 nucleotide sequences.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-14, 16-20, 22 and 23 are pending

Claims 2, 3, 13, 14, 16-2, 22 and-23 are withdrawn as drawn to non-elected inventions.

Claims 1 and 4-12 are elected, to the extent they are drawn to SEQ ID NO: 1. Applicant is reminded of the requirement to cancel non-elected material and non-elected claims.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 and 4-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 and claims 4-12 dependent thereon are indefinite in the recitation of delta-6-acetylenase and/or delta-6 desaturase activity, since it is unclear if it has both activities or not. And if it has only one activity, then only one activity should be claimed.

5. Claim 1 and claims 4-12 dependent thereon are indefinite in the recitation of part b), which is confusing as it seems to duplicate what is claimed in part c), which encompasses all sequences that code for SEQ ID NO: 2.

6. Claim 1 and claims 4-12 dependent thereon are indefinite in the recitation of "negligible reduction in the enzymatic action", since it is unclear what would constitute a "negligible reduction", and the specification fails to define or clarify the use of this term.

7. Claim 6, and claim 7 dependent thereon, is confusing in that it is unduly alternative in referring to the nucleic acid sequence of claim 1 as modified in any of four different ways.

8. Claim 8 is indefinite in that they are unduly alternative in referring to "functional or nonfunctional" nucleic acid sequences or "functional or nonfunctional" expression cassettes, wherein in the nucleic acid sequence is linked to one or more regulatory sequences.

9. Claim 8 is also indefinite in that it is unclear what is intended by "functional or nonfunctional", since it is not stated what function is intended, and there is no antecedent basis for this phrase in claim 1.

10. Claims 9 and 10, and claims 11 and 12 dependent thereon are indefinite in the recitation of "oil-producing organism", since most, if not all, organisms produce some form of oil. Therefore, it is unclear what is intended, and the specification fails to define or clarify the use of this term.

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claims 1 and 4-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims are drawn to an isolated nucleic acid which codes for a polypeptide having delta-6-acetylenase and/or delta-6-desaturase activity and having the sequence of SEQ ID NO: 1, or encode SEQ ID NO: 2 or encode a protein having at least 75% homology to SEQ ID NO: 2 with negligible reduction in enzymatic activity. However, the specification fails to describe what structural features are required to confer the claimed combination of activities. The specification only sets forth SEQ ID NO: 1 encoding SEQ ID NO: 2. The specification also does not describe functional or nonfunctional sequences.

"A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus." In addition, "The name cDNA is not in

itself a written description of that DNA; it conveys no distinguishing information concerning its identity. While the example provides a process for obtaining human insulin-encoding cDNA, there is no further information in the patent pertaining to that cDNA's relevant structural or physical characteristics; in other words, it thus does not describe human insulin cDNA . . . Accordingly, the specification does not provide a written description of the invention". See *University of California v. Eli Lilly and Co.,* 119 F. 3d 1559; 43 USPQ 2d 1398, 1406 (Fed. Cir. 1997).

Therefore, given the lack of written description in the specification with regard to the structural and physical characteristics of the claimed compositions, one skilled in the art would not have been in possession of the genus claimed at the time this application was filed.

13. Claims 1 and 4-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims are drawn to an isolated nucleic acid which codes for a polypeptide having delta-6-acetylenase and/or delta-6-desaturase activity and having the sequence of SEQ ID NO: 1, or encode SEQ ID NO: 2 or encode a protein having at least 75% homology to SEQ ID NO: 2 with negligible reduction in enzymatic activity. The claims are also drawn to any of these sequences cloned into a vector and transformed into an organism, which may include a plant, a microorganism or an animal, and including a plant comprising functional or nonfunctional sequences. The claims are also drawn to a process for preparing unsaturated fatty acids or triglycerides from said organism by isolating the oil and liberating and liberating the fatty acids.

However, the specification only teaches the transformation of yeast with two separate constructs Cer1/pYES2 and Cer3/pYES2 (pages 30-34). Yet, there is no clear indication as to the exact sequences that are present in these constructs and how and if they relate to SEQ ID NO: 1. At page 29 of the specification, it teaches that Cer1-50 is SEQ ID NO: 1 and encodes a delta-6-acetylenase and/or delta-6-desaturase, but there is no statement in the specification to show how Cer1-50 relates to Cer1/pYES2 and Cer3/pYES2, if at all. In addition, the specification discusses at pages 32-33 the generation of transgenic plants, but does not mention Cer1-50 or SEQ ID NO: 1. Furthermore, no data is provided to show that the constructs transformed into plants resulted in the production of acetylenic fatty acids or of double bonds at the delta-6 position. The specification does not teach the transformation of any other organisms, including animals to produce acetylenic fatty acids or of double bonds at the delta-6 position, nor does it teach introduction of functional and nonfunctional sequences.

Not only is the specification non-enabling for the use of SEQ ID NO: 1 as a delta-6-acetylenase and/or delta-6-desaturase, the specification does not enable one to make and/or use any variations of SEQ ID NO: 1 that may have nearly the same level of enzymatic activity. Sequence homology is not sufficient to predict function of encoded sequences. See the teachings of Doerks (TIG 14, no. 6: 248-250, June 1998), where it states that computer analysis of genome sequences is flawed, and "overpredictions are common because the highest scoring database protein does not necessarily share the same or even similar functions" (the last sentence of the first paragraph of page 248). Doerks also teaches homologs that did not have the same catalytic activity because active site residues were not conserved (page 248, the first sentence of the last paragraph). In addition, Smith et al (Nature Biotechnology 15:1222-

1223, November 1997) teach that "there are numerous cases in which proteins of very different functions are homologous" (page 1222, the first sentence of the last paragraph). Also, Brenner (TIG 15, 4:132-133, April 1999) discusses the problem of inferring function from homology, stating that "most homologs must have different molecular and cellular functions" (see the second full paragraph of the second column of page 132, for example). Furthermore, Borks (TIG 12, 10:425-427, October 1996) teaches numerous problems with the sequence databases that can result in the misinterpretation of sequence data.

More specifically, identification of related sequences that will encode enzymes having a particular activity is particularly problematic in the enzymes involved in modifying fatty acids, and cannot be determined merely by similarity of DNA or amino acid sequences. Van de Loo et al teach that sequences encoding fatty acid hydroxylase activity are highly similar to other sequences that do not encode a hydroxylase, but instead encode a fatty acyl desaturase (see the abstract, at least). In fact, Broun et al teach that a change in only four amino acids will convert a desaturase gene to a hydroxylase gene (see the abstract, at least). Thus, if sequences are identified only by similarity to other sequences that are known to encode a particular activity that modifies a fatty acid, one cannot conclude that these other sequences also encode enzymes having the same activity.

In addition, De Luca teaches that modifying plant biosynthetic pathways by transforming plants with genes encoding enzymes involved in said pathway is highly unpredictable (see the paragraph bridging the columns on page 225N, for example), and that "on many occasions desired goals have been impossible to achieve" (see the last paragraph on page 228N). Therefore, both the identification of other genes encoding a combination of delta-

6-acetylenase and/or delta-6-desaturase, and the modification of plant lipid composition by transforming a plant with said gene or a portion of said gene are highly unpredictable.

Thus, given the unpredictability of identifying sequences that exhibit delta-6-acetylenase and/or delta-6-desaturase activity and modifying the lipid composition of any organism, including a plant or microorganism or animal; the lack of guidance in the specification for identifying and characterizing sequences that encode delta-6-acetylenase and/or delta-6-desaturase; the lack of working examples of delta-6-acetylenase and/or delta-6-desaturase coding sequences, and the lack of working examples of similar sequences that encode proteins having the same combination of activities; and the breadth of the claims, which includes use of SEQ ID NO: 1 and choosing from the multitude of sequences that would encode a protein that is at least 75% identical to SEQ ID NO: 2, and use of any of said sequences to modify a fatty acid in any organism; it would require undue experimentation by one skilled in the art to make and use the invention as broadly claimed.

The claims are deemed free of the prior art given that the prior art of record does not teach or suggest a DNA sequence of SEQ ID NO: 1 or that encodes a polypeptide that is at least 75% identical to SEQ Id NO: 2.

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth F. McElwain whose telephone number is (571) 272-0802. The examiner can normally be reached on increased flex time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

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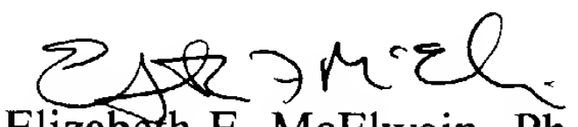

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